AIR POLLUTION CONTROL DISTRICT

CLEARING THE AIR

2019 APCD Workshop Series

Are you curious about the air you breathe, what's in it, and how it's protected?

Join us at our free monthly workshops and get an in-depth look at how we keep the air clean.

FEBRUARY 18	JULY 15
MARCH 18	AUGUST 19
APRIL 15	SEPTEMBER 16
MAY 20	OCTOBER 21
JUNE 17	NOVEMBER 18

6 p.m-7:30 p.m. | Louisville Free Public Library, 301 York St.

For more info, go to www.louisvilleky.gov/APCD

(502) 574-6000

CLEARING THE AIR

2019 APCD Workshop Series

AIR POLLUTION CONTROL DISTRICT

The **APCD Workshop Series** seeks to:

- Increase the community's understanding of Louisville's air and of APCD's many functions
- **EMPOWER** citizens
- Provide a more informal forum for dialogue, Q&A and feedback
- Continue with community engagement efforts

CLEARING THE AIR

2019 APCD Workshop Series

AIR POLLUTION CONTROL DISTRICT

Today's workshop seeks to:

1. Help the community better understand ground-level ozone, precursors that lead to increased levels and how it is monitored in Louisville.

2. Review the current NAAQS for ozone in Louisville.

3. Discuss efforts by APCD, Louisville Metro Government and the community to decrease ground-level ozone.

CLEARING THE AIR

2019 APCD Workshop Series

AIR POLLUTION CONTROL DISTRICT

Remember…

- There are **NO** silly questions
- Public Participation = PP
- Interactive/informal workshop
  - Ask questions as they come to mind
  - Feedback? Email *Clearingtheair@louisvilleky.gov*

Ozone in Louisville

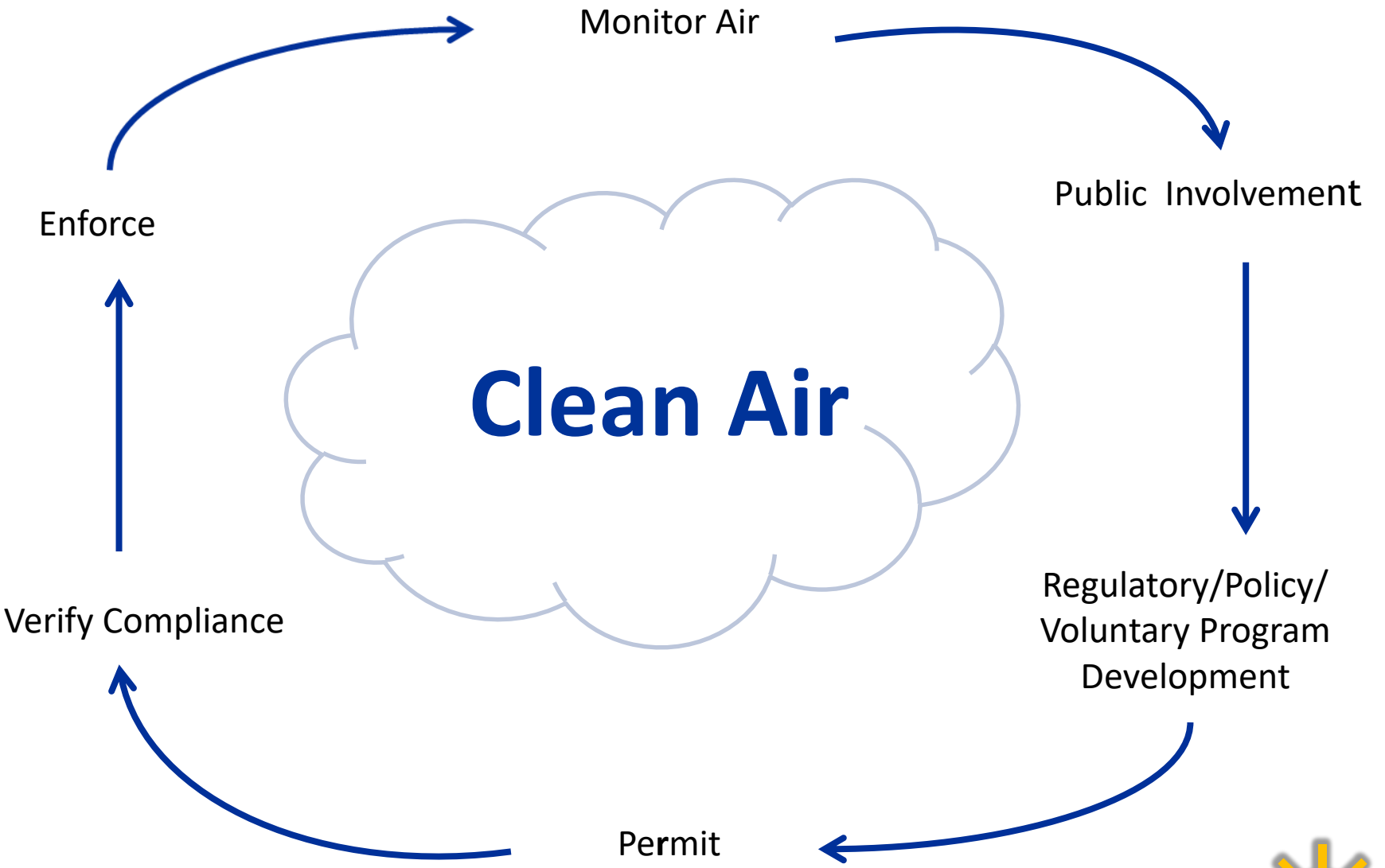
Air Pollution Control District
08/19/2019

APCD

Air Pollution Control District

- APCD is delegated authority to implement CAA in Louisville.
- Agency provides solutions for Louisville Metro air pollution problems that require special understanding of local industries, geography, housing, and travel patterns, as well as other factors.

AIR POLLUTION CONTROL DISTRICT


Monitor Air
Public Involvement
Regulatory/Policy/
Voluntary Program
Development
Permit
Verify Compliance
Enforce
Clean Air

Air Pollution Control District

- To whom do we report?
  - The Community
  - Environmental Protection Agency
  - KY Division for Air Quality
  - Air Pollution Control Board
  - Louisville Metro Government
- How are we funded?
  - Federal Grants
  - Permit Fees
  - Emission Fees
  - Program Fees
  - Louisville Metro General Fund

APCD Goals

Ensure healthy air for breathing

Help local businesses meet air quality standards

Ground-level Ozone

Ground-level Ozone vs. Stratospheric Ozone

- Ground-level Ozone
  - "Bad" ozone
  - Colorless
  - Highly irritating gas
  - Forms just above the earth's surface
  - Secondary pollutant
    - Created via a chemical reaction
- Stratospheric Ozone
  - "Good" ozone
  - Stratospheric layer protects from the sun's ultraviolet rays

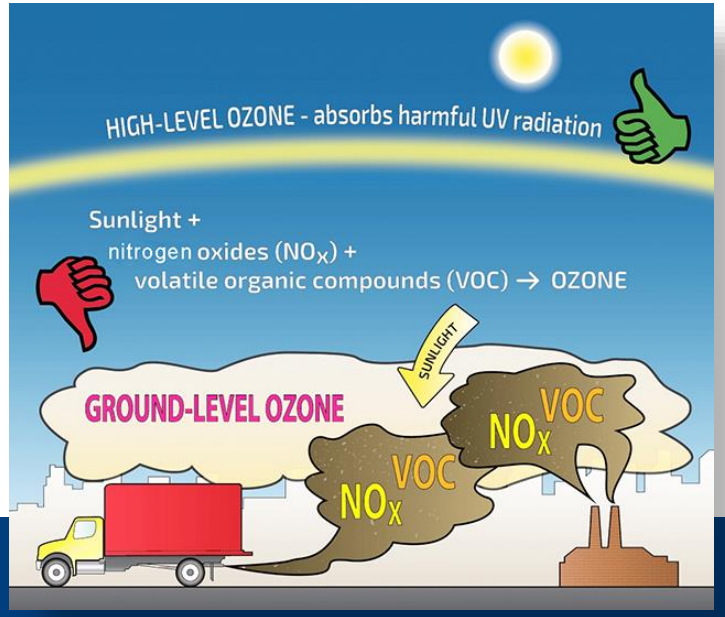
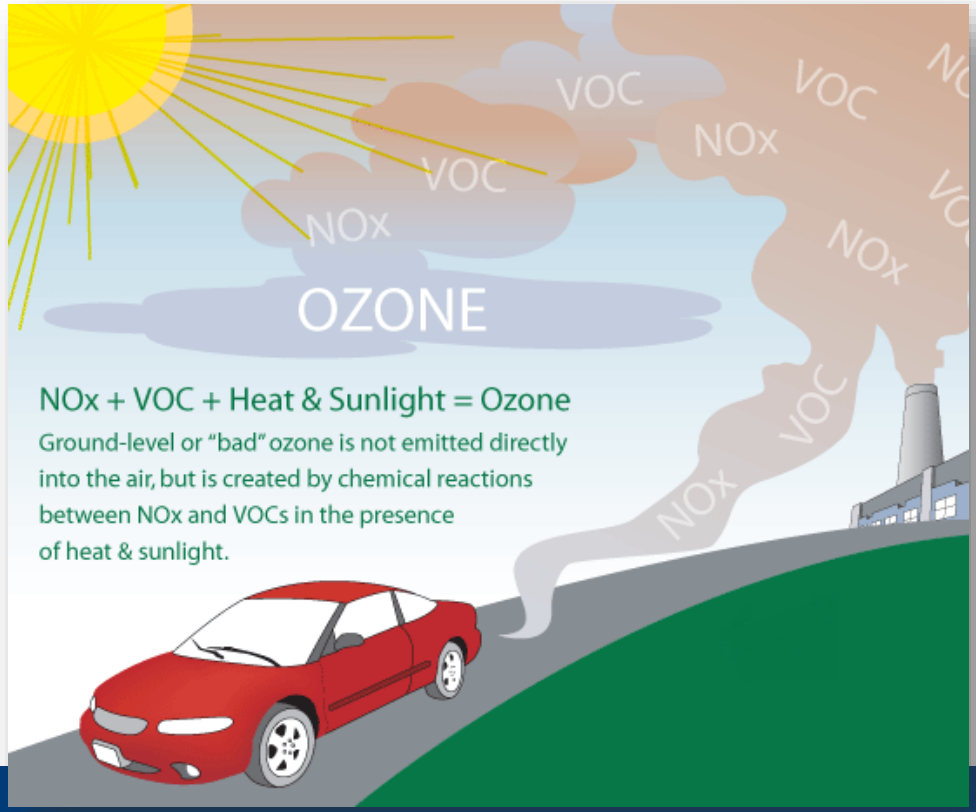


Photo: Washington State Department of Ecology

How is ground-level ozone formed?

Ground-level Ozone: **NO_x + VOCs + Sunlight = O_3**



Oxides of Nitrogen (NO_x)

- From a family of poisonous, highly reactive gases
- Primarily gets in the air from the burning of fuel
- **Contributes to the formation of ground-level ozone ("ozone precursor")**
- Sources: Emitted from cars, trucks, buses, power plants, and off-road equipment

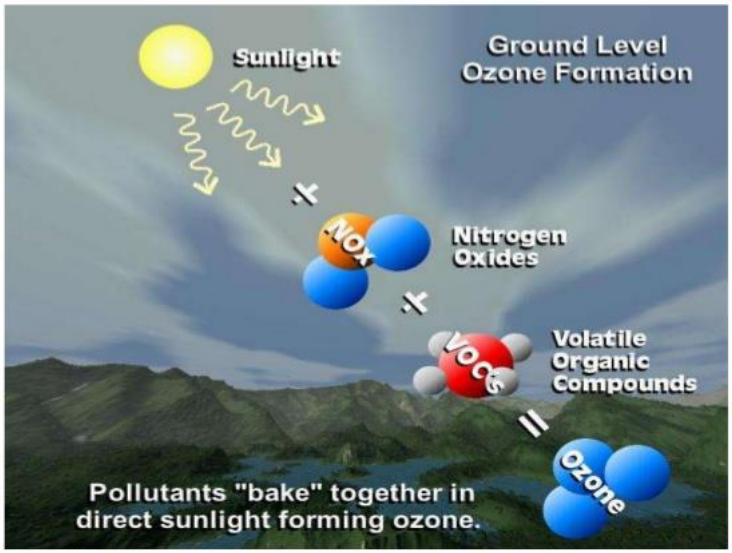
Volatile Organic Compounds (VOCs)

- Organic compounds that easily become vapors or gases
- **NOT** a criteria pollutant
- Sources: Gasoline engines and fueling, solvents, paints, consumer products

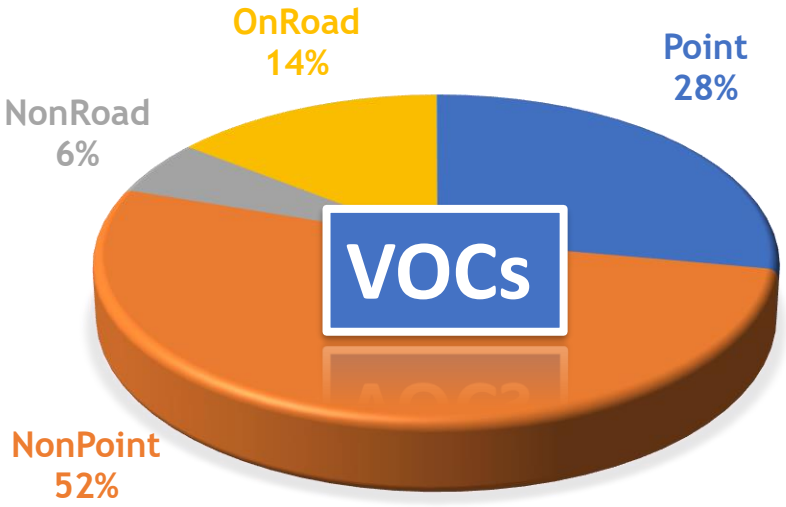
Meteorology

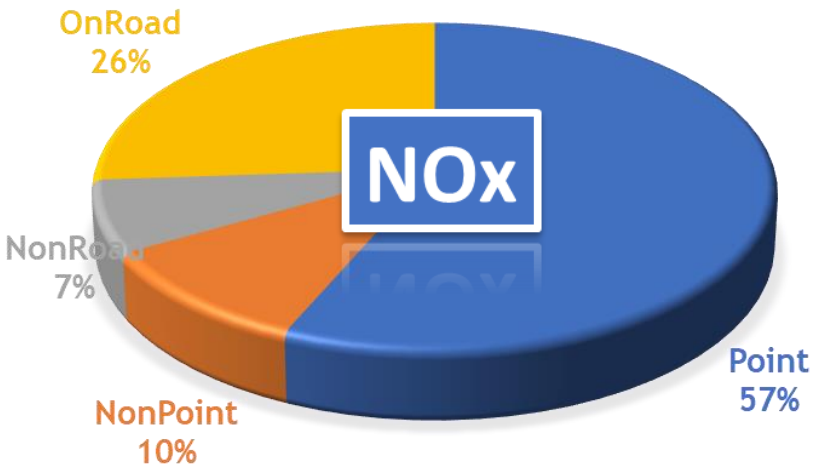
- Assists with the chemical reaction that creates “bad” ozone (*i.e.* sunlight)
- Warm, sunny, dry and stagnant days can create more ground-level ozone
- Can move through a region slowly and accumulate in areas downwind of sources

Chemistry



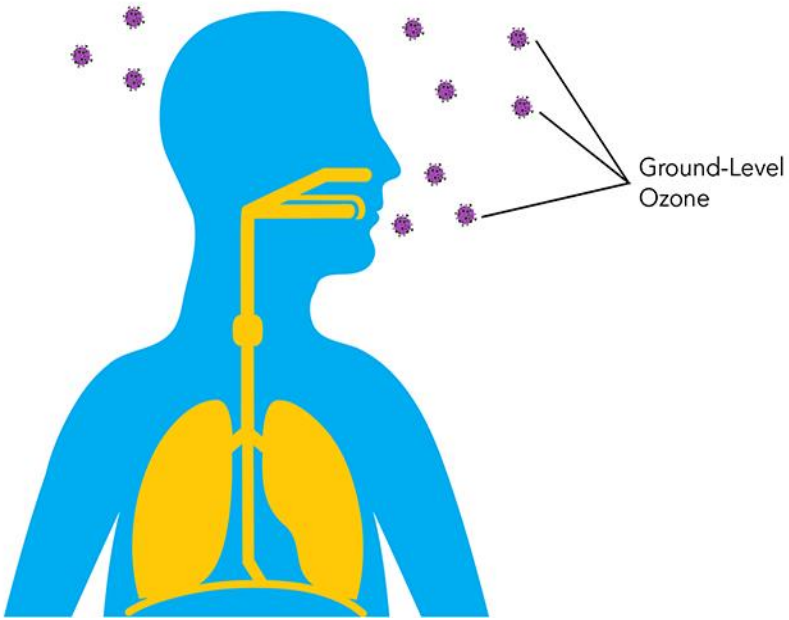
Breakdown of Emissions from Ozone Precursors





Data from 2014 National Emissions Inventory

Health Effects



IF YOU ARE ACTIVE AND EXERCISE OUTDOORS...

OZONE CAN CAUSE YOU BREATHING DIFFICULTY AND EYE IRRITATION.

IF YOU ARE YOUNG OR ELDERLY...

OZONE CAN CAUSE REDUCED RESISTANCE TO LUNG INFECTIONS AND COLDS.

IF YOU ARE ASTHMATIC...

OZONE CAN TRIGGER ATTACKS.

IF YOU SUFFER FROM RESPIRATORY ILLNESS...

OZONE CAN CAUSE WORSENED SYMPTOMS OF COPD (CHRONIC OBSTRUCTIVE PULMONARY DISEASE) OR CHRONIC BRONCHITIS

https://simplestepsbetterair.org/get-smart-about-ozone/

Environmental Effects

- Impacts sensitive vegetation and ecosystems
  - Slows plant growth
  - Increases plant risks of disease or infection
  - Reduces photosynthesis
- Loss of species diversity
- Changes habitat quality

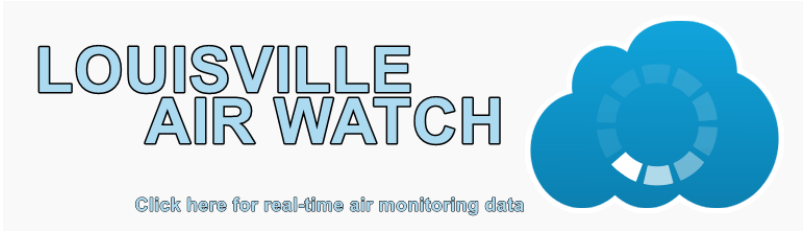
Photos: Black Cherry and Tulip Poplar

Monitoring and Communicating Ozone Air Quality Data

- EPA National Ambient Air Quality Standards (NAAQS)

- APCD air monitoring network

- Air Quality Index (AQI)



National Ambient Air Quality Standards

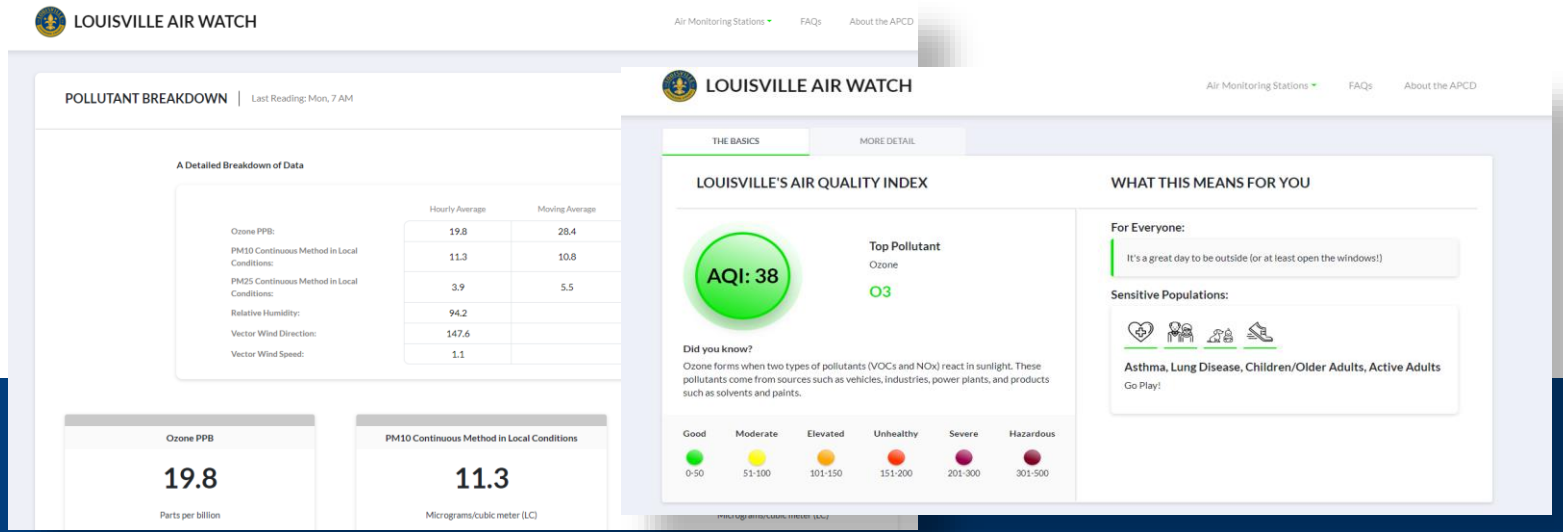
- The Clean Air Act requires EPA to set NAAQS (40 CFR part 50)
- EPA sets NAAQS for **six principal pollutants,** which are called **"criteria" air pollutants:**
  - Carbon Monoxide
  - Lead
  - Particulate Matter
  - Oxides of Nitrogen
  - Sulfur Dioxide
  - Ozone

NAAQS

Pollutant [links to historical tables of NAAQS reviews]		Primary/ Secondary	Averaging Time	Level	Form
Carbon Monoxide (CO)		primary	8 hours	9 ppm	Not to be exceeded more than once per year
			1 hour	35 ppm	
Lead (Pb)		primary and secondary	Rolling 3 month average	0.15 µg/m^3 (1)	Not to be exceeded
Nitrogen Dioxide (NO_2)		primary	1 hour	100 ppb	98th percentile of 1-hour daily maximum concentrations, averaged over 3 years
		primary and secondary	1 year	53 ppb (2)	Annual Mean
Ozone (O_3)		primary and secondary	8 hours	0.070 ppm (3)	Annual fourth-highest daily maximum 8-hour concentration, averaged over 3 years
Particle Pollution (PM)	$PM_{2.5}$	primary	1 year	12.0 µg/m^3	annual mean, averaged over 3 years
		secondary	1 year	15.0 µg/m^3	annual mean, averaged over 3 years
		primary and secondary	24 hours	35 µg/m^3	98th percentile, averaged over 3 years
	PM_{10}	primary and secondary	24 hours	150 µg/m^3	Not to be exceeded more than once per year on average over 3 years
Sulfur Dioxide (SO_2)		primary	1 hour	75 ppb (4)	99th percentile of 1-hour daily maximum concentrations, averaged over 3 years
		secondary	3 hours	0.5 ppm	Not to be exceeded more than once per year

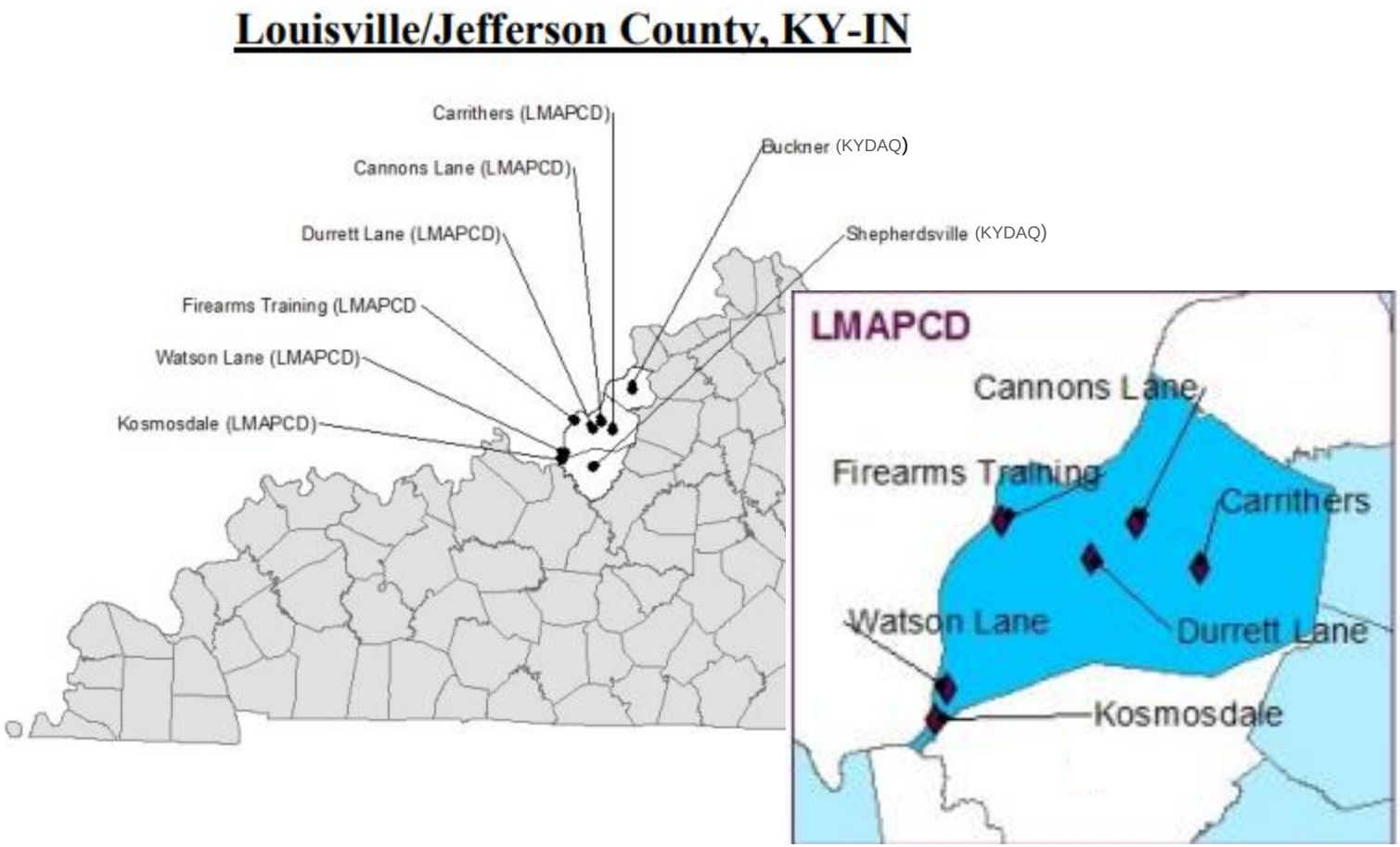
Louisville Air Watch

- The official ambient air quality information web map for the Louisville Metro Air Pollution Control District
  - Provides real-time air monitoring data from EPA-approved air monitors
  - Provides data on air pollution levels for criteria pollutants (O_3, PM, SO_2, CO and NO_2)



AIR POLLUTION CONTROL DISTRICT

Monitoring for Jefferson County, KY



Air Quality Index (AQI)

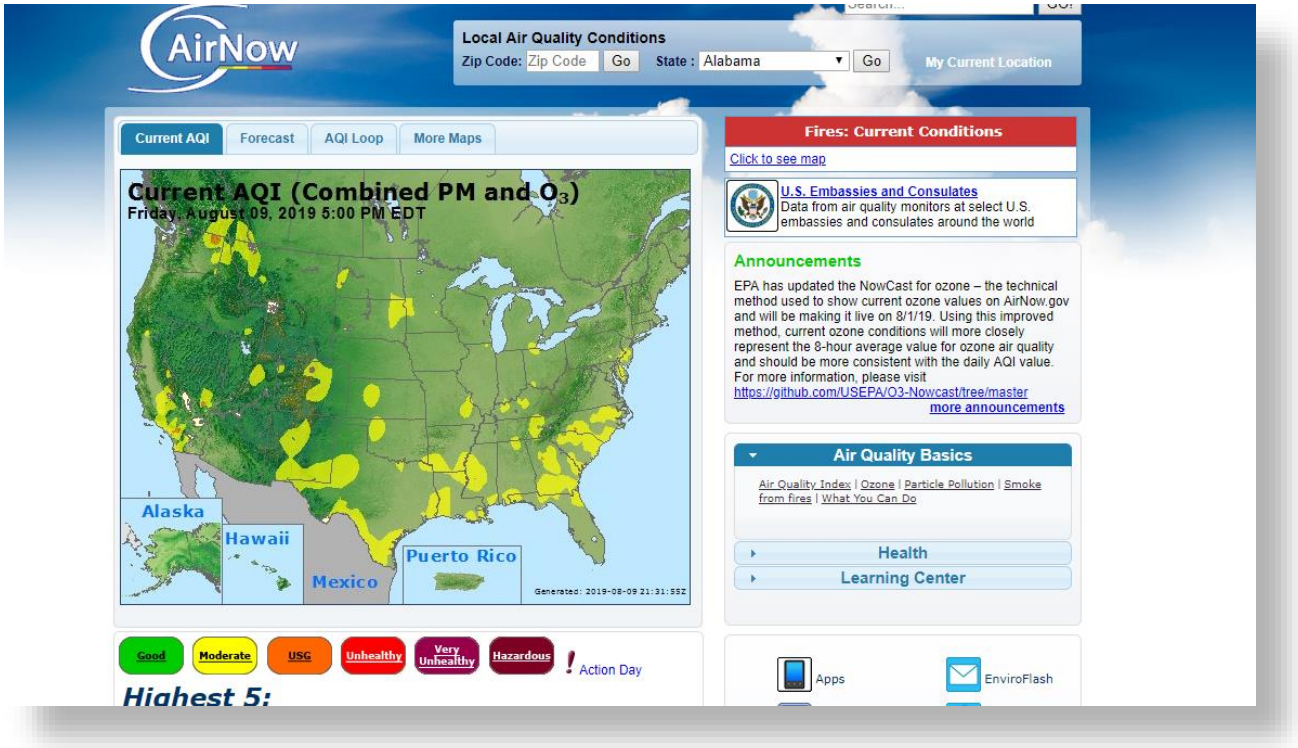
- Created to provide daily analysis and reporting of air quality in a uniform manner
- The AQI is calculated for **four** Criteria Pollutants:
  - Ozone
  - Particle pollution
  - Carbon monoxide
  - Sulfur dioxide

- AQI value of 100 generally corresponds to the NAAQS. **At or below 100 are generally thought of as satisfactory**.

A Guide to the AQI

AQI Values	Actions to Protect Your Health From Ozone
Good (0 - 50)	None
Moderate (51 - 100*)	Unusually sensitive people should consider reducing prolonged or heavy outdoor exertion.
Unhealthy for Sensitive Groups (101 - 150)	The following groups should reduce prolonged or heavy outdoor exertion: - People with lung disease, such as asthma - Children and older adults - People who are active outdoors
Unhealthy (151 - 200)	The following groups should avoid prolonged or heavy outdoor exertion: - People with lung disease, such as asthma - Children and older adults - People who are active outdoors Everyone else should limit prolonged outdoor exertion.
Very Unhealthy (201 - 300)	The following groups should avoid all outdoor exertion: - People with lung disease, such as asthma - Children and older adults - People who are active outdoors Everyone else should limit outdoor exertion.

AirNow



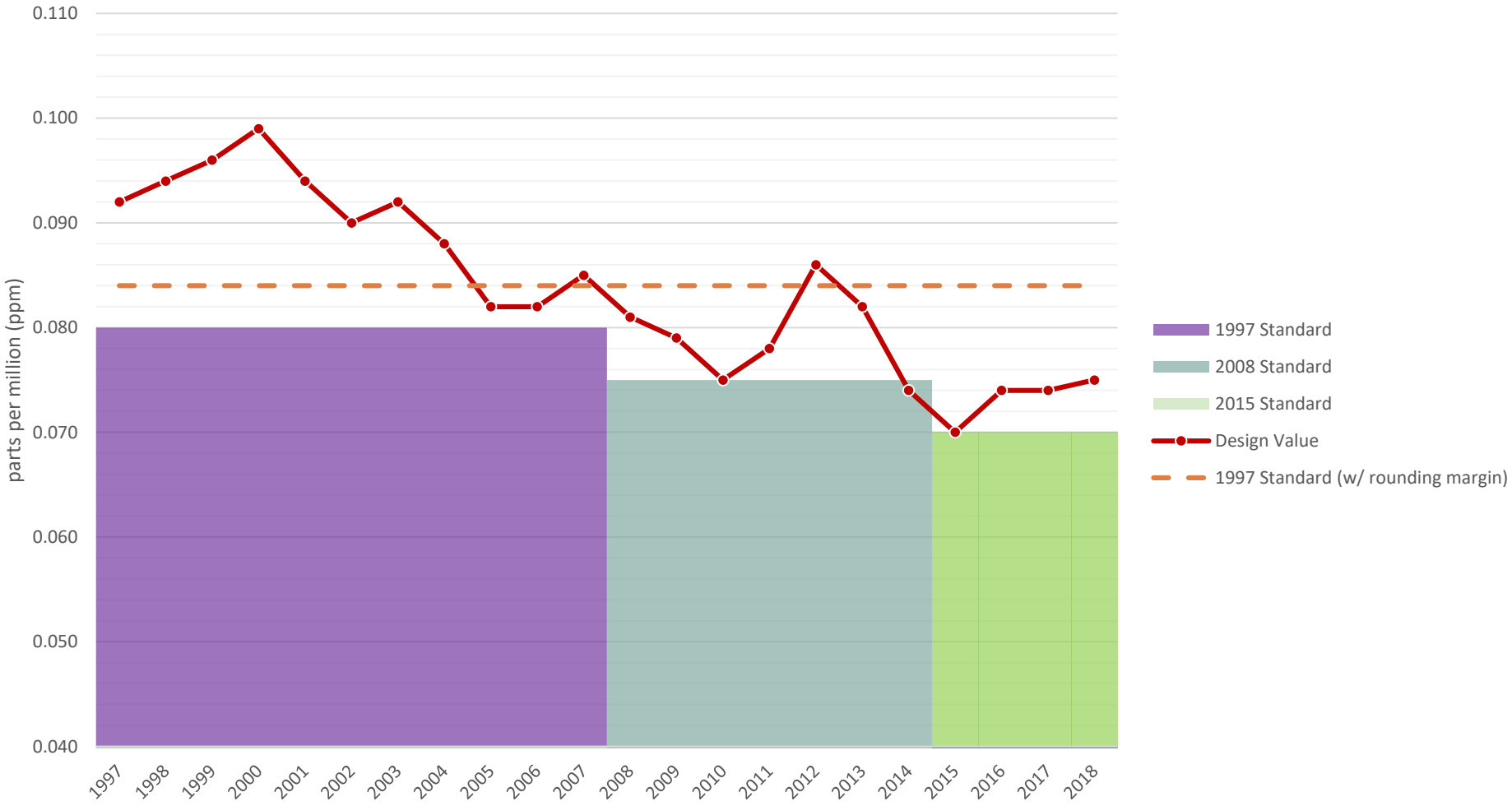
- Offers daily AQI conditions for over 300 cities in the U.S.
- Provides the public with air quality forecasts

Ozone:
Current Status

Current NAAQS Status

Pollutant	Standard	Averaging Time	Attainment Status
Carbon Monoxide	9 ppm	8-hour	Attainment
	35 ppm	1-hour	Attainment
Lead	0.15 µg/m^3	Rolling 3-month Average	Attainment
Nitrogen Dioxide	53 ppb	Annual Average	Attainment
	100 ppb	1-hour	Attainment
Particulate Matter (PM10)	150 µg/m^3	24-hour	Attainment
Particulate Matter (PM2.5)	12.0 µg/m^3	Annual Average	Attainment
	35 µg/m^3	24-hour	Attainment
Ozone	0.070 ppm	8-hour	Nonattainment
Sulfur Dioxide	75 ppb	1-hour	Partial County Nonattainment

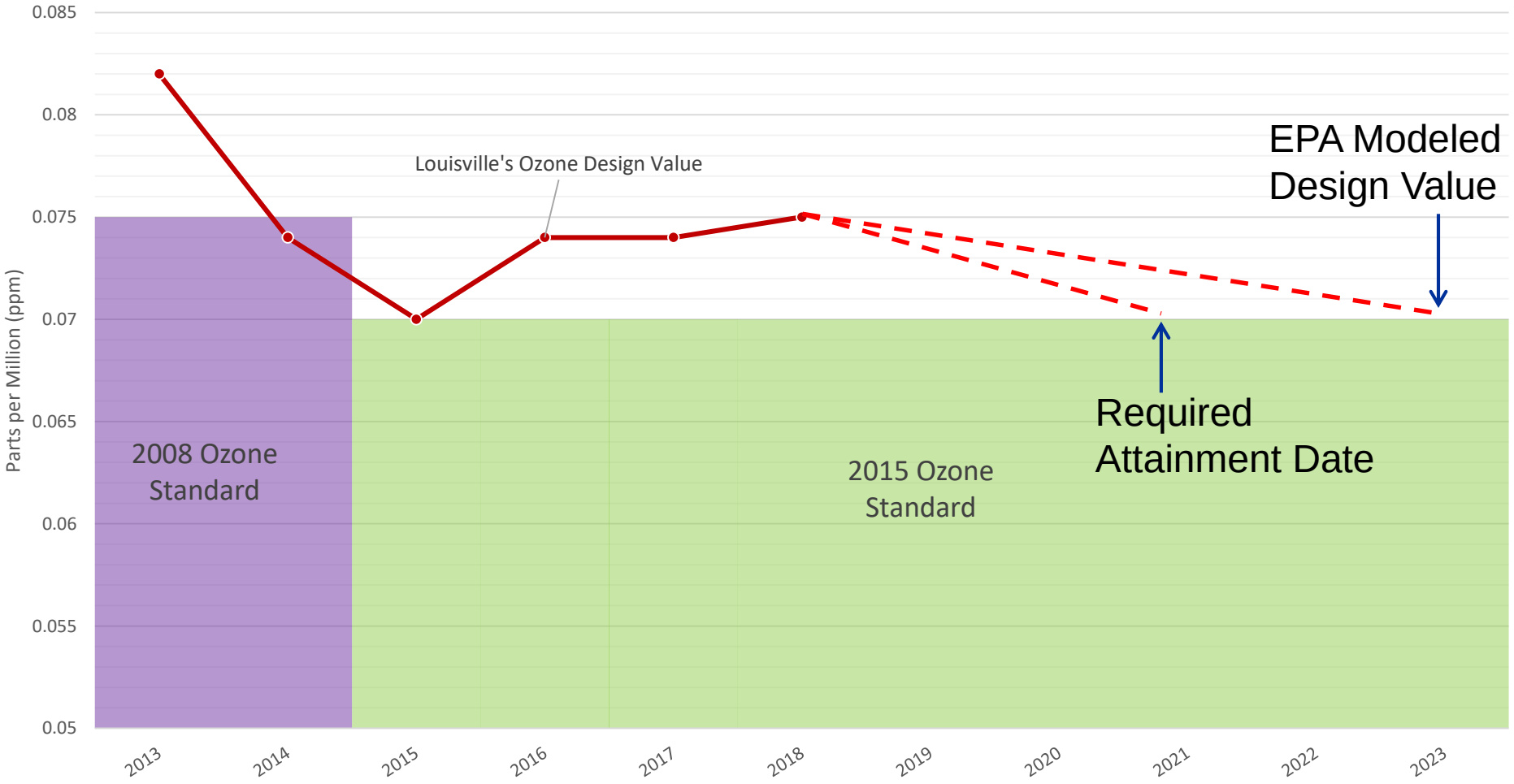
Ozone Trend



AIR POLLUTION CONTROL DISTRICT

*Ozone design value is the annual 4th highest eight hour average concentration, averaged over three years

Ozone Projections



Reducing Ozone Pollution

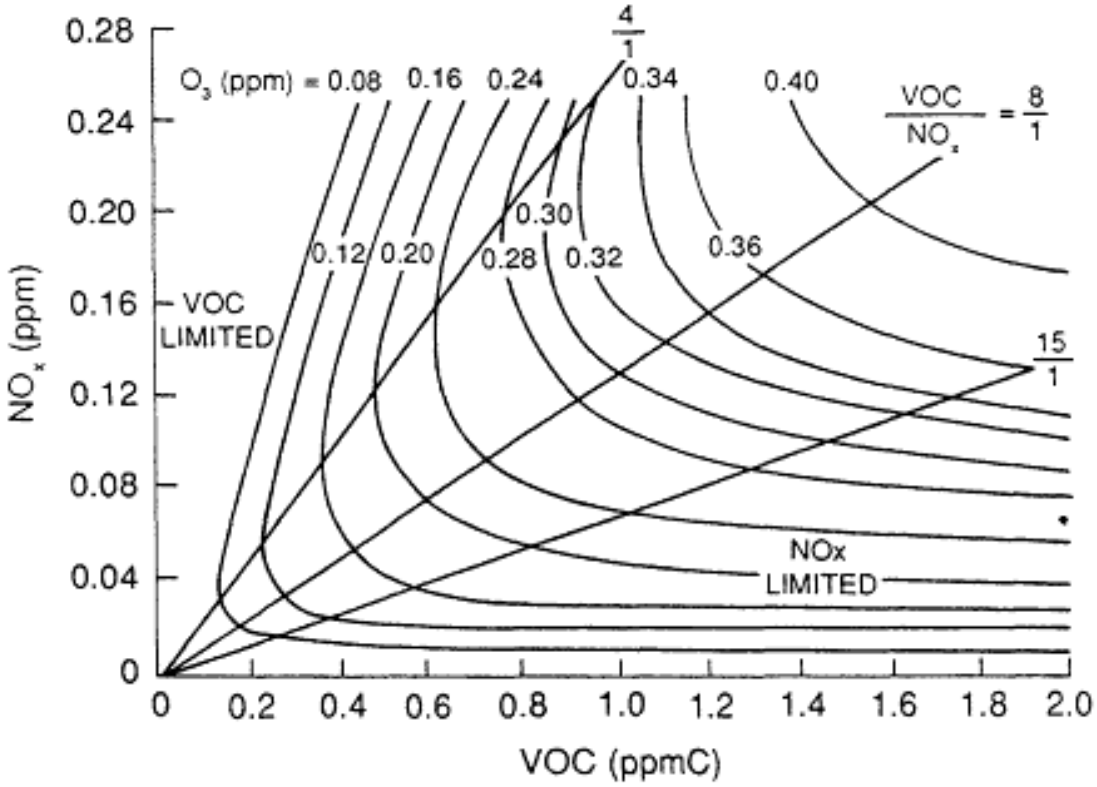
Addressing Ozone Pollution

- Ozone Formation Study
- U.S. EPA/APCD Multi-Pollutant Risk-Based AQ Management Strategy Project
- SIP Planning
- LMG Initiatives
- KAIRE – Idle Free
- Grow More Mow Less
- Lawn Care for Cleaner Air
- Energy Efficiency

KAIRE
KENTUCKIANA AIR EDUCATION

Ozone Formation

- NO_X + VOCs + Sunlight



Ozone Formation

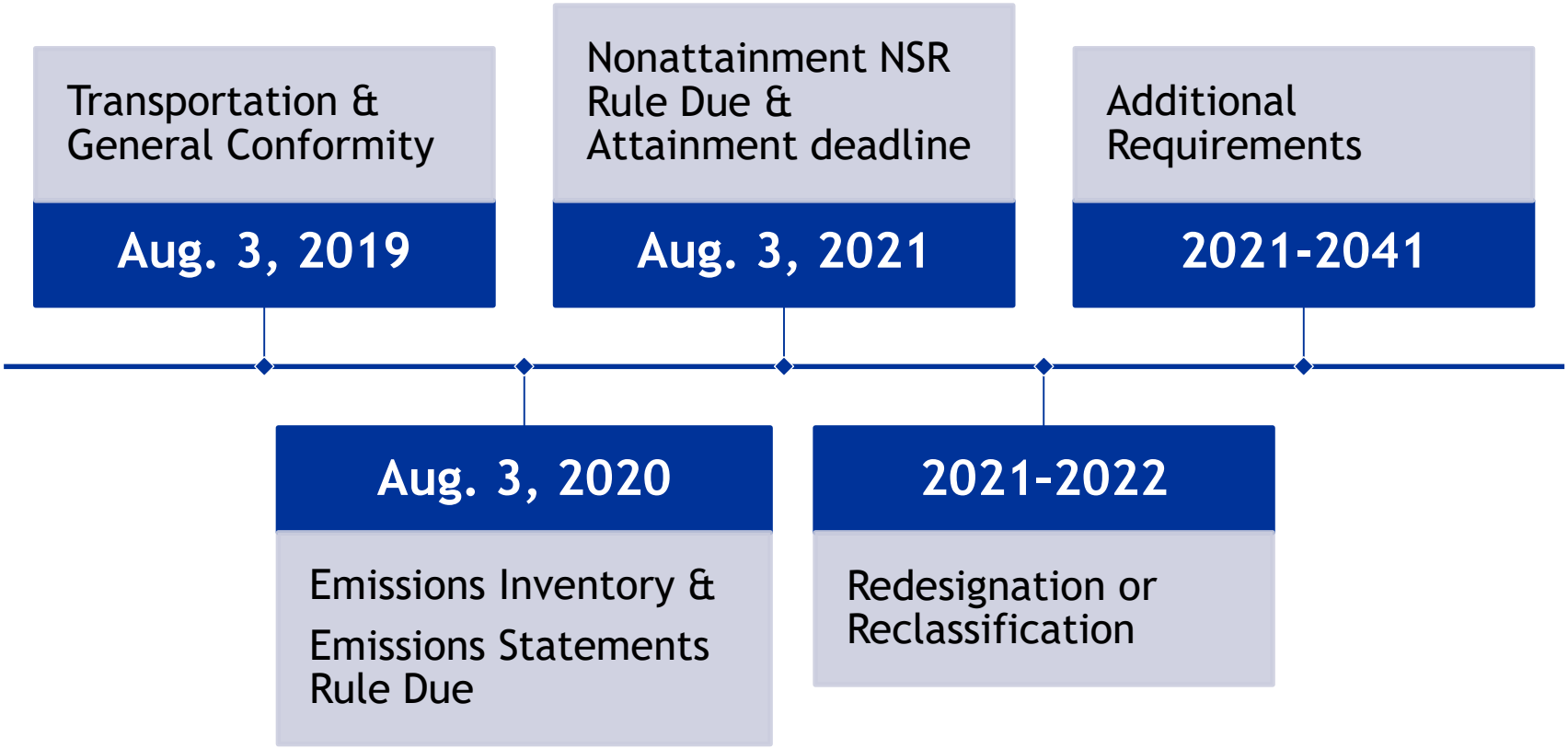
Ozone Formation Study

Goal	Outcomes
• Refine understanding for the regional drivers of ozone formation to make strategic policy decisions	• Comprehensive inventory of compounds contributing to the formation of ozone • Refined understanding of Ozone sensitivity to NOx/VOC reductions • Scale of relative reactivities of VOCs in the ambient air of Jefferson County

Multi-Pollutant Risk-Based AQ Management Strategy Project

Goal(s)	Outcomes
• Evaluate and prioritize control strategies to reduce ozone and come into attainment with NAAQS • Explore co-benefits of ozone reduction strategies to air toxics and fine particulate emissions • Use BenMAP to quantify the anticipated health benefits of air quality improvements	• Prioritized emission reduction strategies • Quantified health outcome improvements and associated benefits • Stakeholder input

SIP Planning

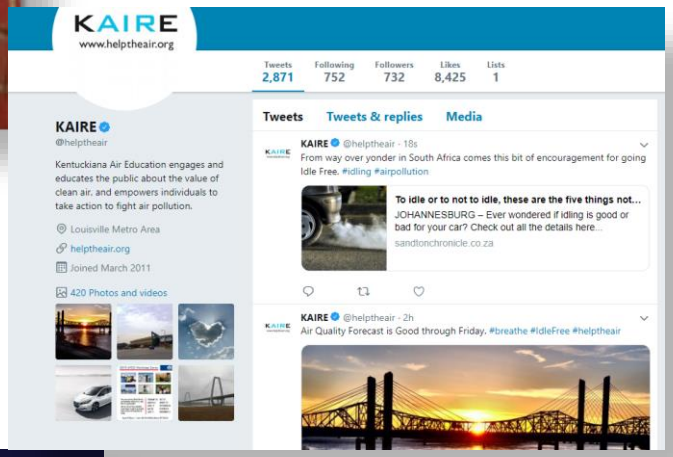


Other LMG Initiatives

- Move Louisville
  - Louisville's 20-year multi-modal plan
  - Seeks to reduce number of miles Louisvillians drive; provide and improve mobility options
- Drive Clean Louisville
  - LMG team planning for and exploring opportunities related to EVs and clean fuel transportation
  - Greening LMG fleet
- Sustain Louisville
  - GHG emissions reduction goals

In My Car – KAIRE

- Program increasing awareness of the impact individual choices have on local air quality
  - Idle Free Program
  - Transportation Options
    - Bike, walk, drive an EV/Hybrid, carpool or rideshare (Every Commute Counts)



In My Yard – GMML

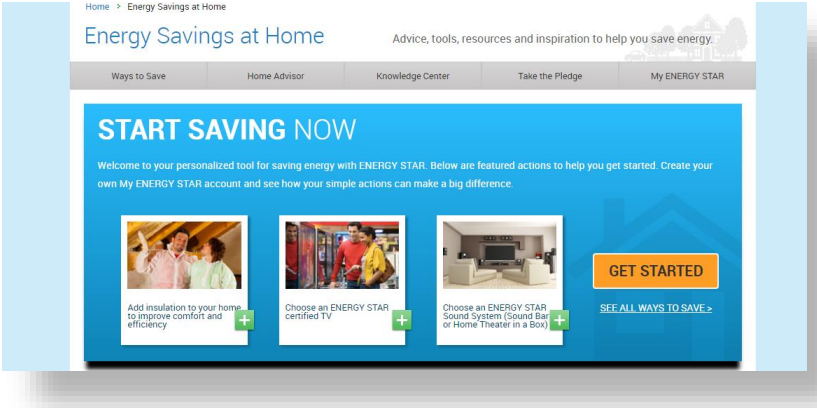
- **Grow More Mow Less**
  - Replace grass with low-mow landscaping (*e.g.* trees, shrubs, bushes, flowers, ground cover, etc.); no need to mow
  - Numerous co-benefits: storm water management increased habitat for wildlife, reduction of urban heat

In My Yard – LCCA

- **Lawn Care for Cleaner Air**
  - Program providing **rebates** to replace gas-powered lawn equipment with cleaner electric and/or human-powered lawn equipment.
  - Electric lawn equipment reduces harmful lawn-related air emissions

In My Home

- Decrease the use of consumer products that emit harmful VOCs (*e.g.* paints, solvents, air fresheners, aerosol sprays)
- Invest in energy efficient appliances



Moving Forward

- Continue conversations and dialogue with the community
- Collaborate with peer air agencies
  - KY DAQ
  - IDEM
- Implement strategies from multi-pollutant project

Questions?

Louisville Metro
Air Pollution Control District

701 W. Ormsby Ave.
Ste. 303
Louisville, Ky. 40203

(502) 574-6000
www.louisvilleky.gov/APCD

Keith H. Talley Sr., Director

Resources

Air Pollution Control District

Louisvilleky.gov/APCD

Environmental Protection Agency (EPA)

Epa.gov/ground-level-ozone-pollution/ground-level-ozone-basics

Epa.gov

Epa.gov/Region4

Department of Energy

https://www.energy.gov/energysaver/energy-saver

Louisville Air Watch

Airqualitymap.louisvilleky.gov/

AirNow

Airnow.gov/

Kentucky Division of Air Quality

Air.ky.gov

Energy Star

https://www.energystar.gov/

Resources

KAIRE

Helptheair.org
Facebook.com/helptheair
Twitter.com/helptheair

Lawn Care for Cleaner Air

Louisvilleky.gov/government/lawn-care-cleaner-air

Grow More Mow Less

Louisvilleky.gov/government/air-pollution-control-district/grow-more-mow-less

Facebook.com/GrowMoreMowLess

https://www.energy.gov/energysaver/energy-saver